

ASSOCIATION OF HAPTOGLOBIN GENOTYPES, BREAST CANCER AND MALARIA IN  
A POPULATION OF NIGERIAN WOMEN

BY

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JUNE, 2019

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**A DISSERTATION SUBMITTED TO THE DEPARTMENT OF BIOCHEMISTRY,  
COLLEGE OF SCIENCE AND TECHNOLOGY, COVENANT UNIVERSITY, OTA,  
OGUN STATE, NIGERIA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR AWARD OF M.Sc. DEGREE IN BIOCHEMISTRY**

**JUNE, 2019**

## ACCEPTANCE

This is to attest that this dissertation is accepted in partial fulfilment of the requirements for the award of the degree of M.Sc. in Biochemistry in the Department of Biochemistry, College of Science and Technology, Covenant University, Ota.

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## DECLARATION

I, OBI, PATIENCE OLUCHUKWU with matriculation number 11CP011782, affirm that this research was carried out by me under the supervision of Dr. T. M. Dokunmu of the Department of Biochemistry, Covenant University. I attest that the dissertation has not been presented either wholly or partly for the award of any degree elsewhere. All the sources of materials and scholarly publications used in the thesis have been duly acknowledged accordingly.

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Signature & Date

## CERTIFICATION

We certify that this dissertation titled “**ASSOCIATION OF HAPTOGLOBIN GENOTYPES, BREAST CANCER AND MALARIA IN A POPULATION NIGERIAN WOMEN**” is an original work carried out by **OBI, PATIENCE OLUCHUKWU** with matriculation number **11CP011782** in the Department of Biochemistry, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria, under the supervision of Dr. T. M. Dokunmu. We have examined and found the work acceptable for the award of a degree of M.Sc. in Biochemistry.

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## **DEDICATION**

I dedicate this project report to the Almighty God. I also dedicate this project to my family for their moral and financial support during the compilation of this project.

## ACKNOWLEDGEMENT

I acknowledge God for His utmost mercies and wisdom that was sufficient for me.

I would like to acknowledge my supervisor Dr. T. M. Dokunmu for her utmost supervision: correcting my mistakes and putting me through.

I would like to acknowledge Dr. S. O. Rotimi for his guidance and immeasurable impact in the success of this project.

I sincerely want to say thank you to Federal Medical Centre, Abeokuta and Lagos State Teaching Hospital for their dedication and contribution in making sure the blood samples were gotten promptly.

I acknowledge the Head of Department of Biochemistry, Professor O. O. Ogunlana for being there to guide me and always willing to help me when I had any issue.

I acknowledge Dr. O. Yakubu, Miss Bose and the Industrial training students at the molecular laboratory: Faith, Muna, Alfred, Chisom, Victory, Jimmy and Olamide for all their help during the course of my project.

I want to say a big thank you to Covenant University, for giving me the opportunity and leverage to harness my full potential in Biochemistry and making me who I am today.

I would also like to thank the faculty and staff of the Department of Biochemistry, without whom this project would not have been a success.

God bless you all richly.

Obi, Patience Oluchukwu

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## LIST OF ABBREVIATIONS

ACT	Artemisinin Combination Therapy
BRCA 1and 2	Breast Cancer Associated Gene 1 And 2
COX III	Cytochrome Oxidase III
DCIS	Ductal Carcinoma In Situ
EGFR	Epidermal Growth Factor Receptor
ER	Estrogen Receptor
HER2/ERBB2	Human Epidermal Growth Factor Receptor 2
HP	Haptoglobin
IARC	International Agency for Research on Cancer
LCIS	Lobular Carcinoma In Situ
LICs	Low-income Countries
MRI	Magnetic Resonance Imaging
NGS	Next-generation Sequencing
PALB2	Partner and Localizer of BRCA 2
PCR	Polymerase Chain Reaction
PR	Progesterone Receptor
PTEN	Phosphatase and Tensin Homolog
SEER	Surveillance, Epidemiology, and End Results
TNBC	Triple Negative Breast Cancer
WHO	World Health Organization

## ABSTRACT

Breast cancer is the leading cause of mortality among women with over a million cases recorded globally. Haptoglobin (Hp) is an acute phase glycoprotein whose major role is to remove free hemoglobin from circulation. The prevalence of Hp genotypes varies between populations from different countries and ethnic groups. Several studies have investigated the association of haptoglobin genotypes with breast cancer occurrence, but have reported conflicting results. However, only few studies have investigated the incidence of Hp genotypes, and their association to breast cancer occurrence and malaria in Nigeria. In this study, the association of haptoglobin genotypes, breast cancer and malaria was investigated among healthy women and clinically diagnosed breast cancer patients. Blood samples were collected from Lagos and Ogun States, and DNA was extracted using standard methods. Haptoglobin genotypes and malaria were detected by polymerase chain reaction (PCR) and agarose gel electrophoresis in breast cancer patients (n=75) and healthy controls (n=287). The percentage distribution of the 362 women that participated in the study was as follows: Hp 2-1 (39.8%) genotype had the highest prevalence, followed by Hp 1-1 (34.5%), and Hp 2-2 (25.7%). A highly significant increase in Hp 1-1 genotype ( $P<0.05$ ) was observed among patients in the BC group when compared with the control group. Furthermore, a higher frequency of Hp 1 allele (54.4%) than Hp 2 allele (45.6%) was observed from both groups. However, no significant difference was observed in Hp 1 allele among the BC group when compared with the control group. A significant increase in Hp 1 allele ( $P<0.05$ ) was observed among malaria-positive patients in the control group. An increase in Hp 1 allele was also observed in BC group, but it was not significant. The result of this study suggest an association between Hp 1-1 genotype and breast cancer occurrence, and an association between Hp 1 allele and increased risk of malaria infection.

Keywords: Breast cancer, haptoglobin, malaria, genotype, allele